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Multitemporal satellite change detection investigations for documentation and valorization of cultural landscape

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Multitemporal satellite change detection investigations for documentation and valorization of cultural landscape

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The paper focus on the setting up of a methodology for analyzing cultural landscapes to extract information about ancient civilization settlements, land-use variations, stratified anthropogenic environment, human impacts on landscape, as well as climate driven changes over short, medium, and long periods of time.
The analysis of cultural landscape along with its protection and preservation strategies requires the contribution of integrated disciplines and data source, and, above all, the fusion of multi-temporal and multi dimensional data available from different sources. In this contest satellite time series may help us in improve knowledge content of cultural landscape and heritage .
The methodology approach we devised is focused on multitemporal/multisource/multiscale data analysis as a support for extracting (i) archaeological settlements and (ii) potential ancient land-use patterning. To these aims, DTM from SRTM and ASTER along multispectral data from TM, ASTER and Quikbird have been used. In order to make the satellite data more meaningful and more exploitable for investigations, reliable data processing have been carried out. Over the years a great variety of digital image enhancement techniques have been devised for specific application fields according to data availability. Nevertheless, only recently these methods have captured great attention also in the field of archaeology for an easier extraction of quantitative information using effective and reliable semiautomatic data processing. The setting up of fully-automatic methodologies is a big challenge to be strategically addressed by research communities in the next years.

Multitemporal, multiscale and multisensor satellite data sets can provide useful tool for extracting information and traces related both to modern and ancient civilizations still fossilized in the modern landscape.

Reference

Lasaponara R, Masini N (2006a) On the potential of panchromatic and multispectral Quickbird data for archaeological prospection. Int J Remote Sens 27: 3607-3614.
Lasaponara R, Masini N (2006b) Identification of archaeological buried remains based on Normalized Difference Vegetation Index (NDVI) from Quickbird satellite data. IEEE Geosci Remote S 3(3): 325-328.
Lasaponara R, Masini N (2007a) Detection of archaeological crop marks by using satellite QuickBird multispectral imagery. J Archaeol Sci 34: 214-21.
Lasaponara R, Masini N (2007b) Improving satellite Quickbird – based identification of landscape archaeological features trough tasselled cup transformation and PCA. 21st CIPA Symposium, Atene, 1-6 giugno 2007.
Lasaponara R, Masini N (2010) Facing the archaeological looting in Peru by local spatial autocorrelation statistics of Very high resolution satellite imagery. In: Taniar D et al (Eds), Proceedings of ICSSA, The 2010 International Conference on Computational Science and its Application (Fukuoka-Japan, March 23 – 26, 2010), Springer, Berlin, 261-269.
Lasaponara R, Masini N (2011) Satellite Remote Sensing in Archaeology : past, present and future. J Archaeol Sc

38: 1995–2002.
Lasaponara R, Masini N, Rizzo E, Orefici G (2011) New discoveries in the Piramide Naranjada in Cahuachi (Peru) using satellite, Ground Probing Radar and magnetic investigations. J Archaeol Sci 38: 2031-2039.
Lasaponara R, Masini N, Scardozzi G (2008) Satellite based archaeological research in ancient territory of Hierapolis. 1st International EARSeL Workshop. Advances in Remote Sensing for Archaeology and Cultural Heritage Management", CNR, Rome, September 30-October 4, Aracne, Rome, pp.11-16.
Lillesand T M, Kiefer R W (2000) Remote Sensing and Image interpretation. John Wiley and Sons, New York.
Masini N, Lasaponara R (2006) Satellite-based recognition of landscape archaeological features related to ancient human transformation. J Geophys Eng 3: 230-235, doi:10.1088/1742-2132/3/3/004.
Masini N, Lasaponara R (2007) Investigating the spectral capability of QuickBird data to detect archaeological remains buried under vegetated and not vegetated areas. J Cult Heri 8 (1): 53-60.